Historic, Archive Document

Do not assume content reflects current
scientific knowledge, policies, or practices.

81 D26

(REPRINT)

REPORT OF

SIXTH ANNUAL

Date Grower's Institute

HELD IN

COACHELLA VALLEY

CALIFORNIA

APRIL 20, 1929

Held under the auspices of and published by the
Coachella Valley Farm Center

Some Remarks On Intercropping Our Coachella Valley Date Orchard

By Robbins Russel, Manager of Tropical Date Company, Thermal

WE are operating what aspires to be at least, a commercial plantation. It has not yet progressed far enough, however, to afford much time or money for exact research and experiment. The following remarks and comments, therefore, are not based on exact data,—being, in fact, only the general observations of a manager of a developing commercial agricultural enterprise, — one of the important crops of which is a date orchard. With this clearly understood, I may proceed:

Other than cover crops of various sorts (which properly belong under the heading of Green Manures and so are not discussed here) my experience covers an interplanting of grapefruit trees among our dates,— the production of a certain number of poultry in the orchard, — and a few experimental plantings of onions, sweet potatoes and sundry other truck crops such as beans, melons, etc. Also, in connection with our poultry work we have tried a certain amount of alfalfa among the palms, as a semi-permanent forage crop and not merely as a green manure.

As can be seen readily from the general list of intercrops actually being grown, our experience barely makes a beginning. This very fact,— that so many and varied crops have been grown all these years past, in this way, would of itself seem to offer strong evidence that there is profit in one form or another, to be gained from such intercropping,— when it is carried on under proper conditions of soil, climate, shade, etc.

A few words will suffice as to Alfalfa: Our experience seems to agree with the very general conclusion that this crop is not profitable when grown for hay (or grazing) in an orchard such as ours.

In similar brief fashion our Truck Crop experience can be summed up: Our plantings of these have been so small in extent and for other reasons inconclusive as to results, that aside from making the obvious comment that such crops produce best on land at once rich, well-drained, and weed-free,—I do not feel competent to offer comment. But, as a general proposition,—since inadequate fertilization of Coachella Valley orchards is more the rule than the exception,— any crop of this nature, drawing heavily on the top soil's resources, is not to be recommended. The principal cause for continued interest in such crops (aside from the universal desire to increase net income) would seem to be for reasons of frost, sun and wind-protection. It is possible that a profitable truck crop interplanting might be developed to take advantage of one or more of these advantageous features,—but certainly it should be thoroughly tested before being generally recommended.

My main qualification to comment on the topic assigned rests in our Marsh Seedless grapefruit planting. This was begun on or about the spring of 1918,—the first trees being Whitney buds on grapefruit root, from the nursery of L. V. W. Brown of Riverside.

About five hundred of these trees were secured during that and the year next following. Their early care and environment was so poor, however, that of the number planted only a few over two hundred now survive. In fact, — about the year 1922 we were seriously considering the removal of all then surviving,— on account of their poor general physical condition,—a notable factor in our not so doing, being the advice of Dr. H. J. Webber, who at that time evinced the greatest interest in the experiment.

These young pomelos were planted throughout a portion of our young date orchard,—one tree being set in the middle of every square, at the four corners of which the palms were located. As the palms were spaced approximately thirty by thirty feet, this system of planting placed the grapefruit trees some 21¼ feet from the nearest date palm. Inasmuch as these palms and pomelos were not far apart in age, a further factor in the rough handling of the latter (as already commented upon) was the avoidance by the mules and their drivers, of all possible contact with the widespread offshoot growth of the date palms, even to the extent of running into and over the young grapefruit trees.

No changes were made in this initial planting,—other than the removal of trees too badly damaged ever to make profitable producers and the provision of lanes or alleyways through and around the edges of the orchard, by which wagons and implements could pass readily,—until the spring of 1927. By this date we were sufficiently convinced of the soundness of this system of double cropping,—on the basis of the performance of both our interplanted palms and grapefruit trees,—to obtain sufficient of the latter (this time on sour-orange root with pedigreed Fruit Growers Supply Company buds) to complete the interplanting of our older orchard in particular. These latest trees are now growing nicely and will produce their first crop the coming winter and spring. Unless new developments arise to change our opinions, we plan to intercrop all our future orchard plantings in this way, in our present locality at least.

As to our main reasons for this conclusion a few words will suffice as an outline:

First: Our plantation apparently is located in one of the preferred citrus districts and also has demonstrated that it is capable of producing fine dates:

Second: Careful examination of our grapefruit trees and fruit during and following every cold "snap" since 1921, has disclosed at the worst only negligible frost damage:

Third: So far as general observation can disclose, neither our grapefruit trees nor our date palms have suffered adversely as to quality or quantity of fruit produced, either when compared with similar trees not so interplanted on other parts of our plantation, or in other sections of the Coachella Valley:

Fourth: Under our cultural conditions, the only added costs of moment arising from this interplanting (over those incurred in operating a date orchard of similar size) would appear to be for the pruning and picking of the grapefruit, for heavier

fertilization and for interest and depreciation on the additional capital invested per acre.

Fifth: Our interplanting would appear to offer notable protection to the citrus trees from sun and wind damage both and probably also, from frost.

Sixth: As our trees grow the shading of the soil on which the orchard is located increases,—with a resultant preservation of soil humus and flora and the discouragement of all sun loving weed pests, notable among which is Bermuda grass.

Based on experience to date, the outstanding objections under our conditions, to the interplanting of dates and grapefruit as we have done, appear to be few in number and these strictly mechanical ones. Principal among these may be numbered:

First: A somewhat congested planting results, making cultivation and preparation of the soil for irrigation rather more difficult than without the interplanted pomelos:

Second: Some damage is certain to occur to the lower branches of the pomelos, due to passing machinery and livestock:

Third: A substantial diminution in the soil area available for the growth of green manure crops, results,—such crops being of course one of the basic and least expensive forms of fertilizer available to us.

Many other points both pro and con, have been advanced as regards this experiment, during the years it has been under observation. But actual experience has seemed to dispose of most of these, leaving only those just above listed, together with the increased capital outlay, to weigh against this system under our conditions.

Against these objections and for the system as we have it on our plantation, there is the production of at least one and one-half crops from the same area that under the single crop system, can at best produce only one crop in a like period of time.

The added cost of fertilization,—due both to the increased demand of the double tree crop and to the lessened surface area available for green-manure crops, — has been, I have felt, the objection of greatest weight in connection with our interplanting. In considering ways and means for overcoming this, the idea of running poultry under the trees was experimented with and is at present being applied somewhat extensively.

Since we are speaking from the point of view of effect on the date orchard only, no discussion of our poultry experience will be included here save the statement that following tests we are making bronze turkeys our big crop.

These birds spend the large part of their adult life under the palms. In this fashion, — by movement of feeding stations and roosts,—we obtain heavy manuring of the soil at no direct charge to us,—to the extent of some two or more tons per acre per year.

In addition, the birds consume weed-seed and many other kinds of seed and green-growth, insects, small mammals such as mice, and thoroughly discourage the surface travel of such pests as gophers and ground squirrels. All waste fruit falling to the ground is of course consumed, also.

As an offset to these desirable attributes, our poultry flock is responsible for the following objections, among others:

First: A flock of turkeys will speedily and thoroughly "puddle" the surface of freshly irrigated land, so that cultivation is necessary more frequently than would otherwise be the case under our conditions:

Second: Having the birds makes expensive, coyote-proof fence necessary, which in addition to its cost, hampers the free cultivation of the orchard:

Third: The birds, unless carefully watched, will do much damage to all low-hanging date bunches, — though apparently not at all interested in the pomelo fruit or foliage.

It is my present opinion that given a varied plantation such as ours,—capable of producing as an economical part of the crop cycle, ample alfalfa and other green feed for the flock,—the birds are on the whole desirable and profitable. But this question is far less definitely settled than that of interplanting the grapefruit and dates,—our data being of too brief duration and limited extent to permit of fairly final conclusions.

Summing up these brief remarks, it is sufficient to say that I believe an almost symbiotic relationship to exist between our date palms and grapefruit trees, under the conditions existing on our plantation; that as a secondary crop to these two, livestock (in our case turkeys) would appear to offer much promise; that other than this my direct experience does not indicate profitable intercrops for the dates, although old world practice points to the certainty of there being others of many sorts awaiting only an opportunity to make good, — when subject to the proper cultural environment.

DISCUSSION

Dr. W. T. Swingle: I would like to ask the difference in handling your grapefruit in 1927 when the palms were grown and the offshoots off and in 1918 when all were alike.

Mr. Russel: In 1927 the palms had grown tall and the offshoots were all, or nearly all, off, while in 1918 the palms were young and crowded with offshoots, so there is no comparison in handling of the cultivating, of course.

Mr. C. E. Cudebec: At what age should we plant grapefruit among the dates—should it be the first year or two, or after the dates are matured so the limbs will be out of the way?

Mr. Russel: To my mind, the best way is to get the offshoots off the dates before planting the citrus.

Mr. T. H. Rosenberger: Why have you got your trees planted in the square formation as you say—does it not cause a great deal of difficulty in cultivating? Would it not be better to have 15 feet between the date palms and citrus in the rows and regular spacing between the rows of dates?

Mr. Russel: Practically all the trees were set out as they are and the dates already growing when we took the place over. If the citrus is planted in the rows with the dates, it will practically fill up all open space. Cultivating on the diagonal gives us a 21¼ foot alley to cultivate in.

Dr. W. R. Faries: I am beginning an experiment with persimmons on my land as it is too cold for grapefruit, and I have some of the finest persimmons planted under my date palms. The palms are tall and out of the way and I have planted persimmons in the rows because I don't cultivate except in the winter time. We could not run the harrow if we did not have the inter-planting in the rows. As the persimmons are very small, we flood the whole ground. The rows are laid in ridges and the persimmons planted on the ridges. I have some basins around my palms, but we do no cultivating—simply send a man in once in a

while to dig the Bermuda grass. We have Armaryllis growing there—they do very well.

Mr. Fred Beyschlog: What are the irrigation requirements for grapefruit and dates?

Mr. Russel: We put on all the water the ground will take and irrigate the entire area. We don't have to irrigate any more frequently with the citrus inter-planted. In general, we irrigate exactly the same throughout the entire orchard.

Dr. Swingle: In the Old World they consider shade a very beneficial thing, and they grow a wide variety of crops in this sort of half shade. This inter-planting is better done after the offshoots are off, as Mr. Russel has said.

Mr. Geo. Ames: Do you increase your fall watering over the requirements of the grapefruit crop I have always been under the impression that the best quality of fruit requires heavy irrigation in the fall. Which is the predominating rule when you have both?

Mr. Russel: On our soil, the more water we can put on the ripening date palms, the better the quality and condition of the fruit seems to be.

Mr. Ames: Do you mean thorough irrigation at one time?

Mr. Russel: We try to irrigate every ten days over the entire place, or at the least twice a month.

Mr. W. S. Howell: The Citrus Station at Riverside tells us grapefruit should use up at least 70% of its available water before irrigating. How can you combine the irrigating of these with the dates, which require 22 feet of water a year?

Mr. Russel: The evidence is such as I have stated.

Relative Moisture and Ash Content of Green and Partially Dry Palm Leaves

By Prof. S. C. Mason, U. S. Experiment Station, Indio

DR. Swingle and Mr. Nixon, having in progress some high-pruning experiments on Deglet Noor trees, an opportunity was given to secure sample leaves in active condition without robbing valuable trees.

Ten freshly cut leaves were taken from each of two trees in Block II of the Experiment Station Garden. From the terms of the pruning experiment a crown of fifty leaves was to be left on each tree, so these leaves came below that and were approximately two years old, but were in perfect condition, showing no signs of fading of any of the pinnae. These lots were numbered I and II and weighed immediately on cutting about eleven o'clock, January 16, 1928. Lot I weighed 86 pounds and Lot II 89¾ pounds. Offsetting these, ten leaves were selected from each of two Deglet Noor trees of approximately the same age having the pinnae faded and dried—not more than 25% of the pinnae still showing green, although the mid-ribs were still bright and unshrivelled. These lots were numbered III and IV and weighed in the same manner as the lots of green leaves. Lot III weighed 59 pounds and Lot IV 61½ pounds. All four of these lots, after weighing, were spread on racks in the sun to allow them to dry as rapidly as possible. They were weighed each 24 hours for the succeeding seven days in order to compare the loss in moisture. At the end of the first 24 hours Lot I had lost 13 pounds or 15.11% of its fresh weight; Lot II, 12.75 pounds or 14.43% of its fresh weight, an average loss for the two green lots of 14.77%. Under the same conditions Lots III and IV, in the first 24 hours, had lost as follows: Lot III, 4 pounds or 6.77% of the freshly cut weight; Lot IV 4 pounds or 6.5%. It will be observed that the loss of moisture on the two green lots (I and II) in the first 24 hours was practically double that of the two dry lots (III and IV). This would be due to causes which will be considered later.

After seven days of air drying, all lots were put in a curing room for two days, exposed to temperatures from electric stoves from 120 degrees to as high as 220 degrees. Weighed after these two days in the curing room, or nine days from the time they were cut, Lot I had lost 37½ pounds or 43.6% of the weight as cut; Lot II had lost 43 pounds or 47.75%. During the same period Lot III of the dry leaves had lost 27½ pounds or 46.61% of its fresh weight, and Lot IV had lost 30.51 pounds or 49.59% of its fresh weight, an average loss of 48.1%.

After these weights of nine days, all the lots remained in a tightly-sealed drying room in which was an open barrel of quick lime to absorb moisture from the air. On May 19th all the lots were again weighed, it being considered that they were as nearly air dry as could be secured under conditions which we had available. Lot I had decreased in weight due to loss of moisture 55.81%; Lot II, 57.66%; an average for the two lots of green leaves of 56.73%. Lots III and IV with dry pinnae had lost as follows: Lot III, 55.08%; Lot IV, 55.28%, or an average for the two of 55.18%. It will look rather surprising that the percentage of loss in the two dry lots and in the two green lots should be so nearly the same, that is, the green lots have lost 56.73% while the average of the two dry lots was 55.18%, a difference of but 1.55%. The pinnae on the two dry lots (III and IV) already being considerably dried, evaporation from them would be much reduced. In the green lots, however, the rachis, or rib, was open for the fresh passage of moisture, while in the dry lots the rib was what might be called soggy or heavy like a water-logged piece of wood. As a matter of fact when the green and dry lots were burned in order to determine the ash content, some of the ribs in Lots III and IV still contained enough moisture to show a slight stewing and bubbling. This must be observed as a source of error in the calculation of loss of moisture in comparison with the freshly cut weight.

On May 19th all of these lots were burned to determine the percentage of ash. It was not considered feasible to burn the four lots separately, so Lots I and II were combined as Lot "A" (fresh leaves) and Lots III and IV were combined as Lot "B"

(dry leaves). After combining Lots I and II into Lot "A" the total dry weight of the twenty leaves was 76 pounds. The total of ash was 9.687 pounds, giving a percentage of 12.74% of ash to the dry weight. In Lots III and IV, or "B," the total dry weight of twenty leaves was 54 pounds; the total weight of ash was 9.67 pounds giving a percentage of ash to the dry weight as 17.9%. A source of error which could not well be avoided lies in the fact that all pinnae in the Experimental Date Gardens are more or less dusty. This dust consisting of very fine wind-blown particles of quartz and mica--perhaps some clay — which are held by the "bloom" or waxy exudations on the surface of pinnae and also are gathered between the foliage side of the pinnae at the base in a very perceptible layer. If this experiment could have been performed soon after a heavy shower much of this dust would have been washed off. As it stands the error would probably be equally great for each of the four lots.

On the 19th of February samples of the ash of "A" and "B" were submitted to Mr. C. S. Scofield, in charge of the laboratories for Boron investigations at Riverside and Santa Paula, with request for analysis of the ash content as far as could be accomplished with their facilities. One of the rather surprising results was the large amount of material recorded as "sand" which seems to be in greater proportion than could have been due to the dust on the leaves, mentioned in the previous paragraph.

In the direct ash weight of samples this "sand" amounted to 38.76% for "A" and 41.81% for "B." Reduced to percentage of actual dry weight of the leaves this amount to 4.93% for "A" and 7.49% for "B." Silica determined by analysis Si0-2, Lot "A" comprised 3% of the dry weight and Lot "B," 4.39%. Of Calcium, Lot "A" contained .93% and "B," 1.42%. Magnesium, "A" contained .19% and "B," .25%. A small amount of Sulphur was found: in "A," .057%; "B," .081%.

It will be noted that in all of these elements mentioned, the percentage to the dry weight of "B," the ash from the old leaves, was decidedly higher than "A," the ash from the green leaves. On the other hand, the analysis shows that Potassium, one of the most important of all the elements of plant fertility, occurred in .56% in "A" and only 33% in "B." Of Boron, which has been found by the Minnesota Experiment Station to be an essential element to plant growth in very minute quantities, the ash of "A" showed 22 parts per million, while in "B" only 17 parts per million. The facilities of Mr. Scofield's laboratory did not enable him to determine the percentage of phosphoric acid.

These results, on the whole, are about what should have been anticipated and probably account for the fading and drying of the pinnae of the dry leaves; that is, the channels conveying the water from the ground through the roots and trunk to the pinnae, where the most important function of plant life, photosynthesis, is performed, had become so clogged with mineral matter that the pinnae were functioning but very feebly. A comparison of different varieties of dates shows that the Deglet Noor retains its leaves in green and functioning condition perhaps the longest of any variety we are acquainted with. Hence we may have a Deglet Noor tree 15 or 20 years old carrying a crown of more than 150 leaves in perfectly functioning condition, while in the Thoory and Saidy varieties, trees of the same age will show less than a hundred active leaves.

In conclusion it will be noted that these experiments were carried out with leaves from four different trees of the Deglet Noor variety, two furnishing green leaves and two dried leaves, and that in a general way the reactions of the two trees of each class agreed quite closely, showing that large errors had probably been avoided. These experiments are only regarded as preliminary but they seem to bring out in a very marked way two important facts. First, that the loss of moisture from the 20 leaves in Lot "A" during the first 24 hours was more than double that from the old and faded leaves, indicating that the fresh leaves were functioning at full capacity; and second, that the mineral contents of the old leaves was nearly 50% higher than in the wholly green ones. The author does not mean by this experiment to fully settle the vexed question of how much or how little a date palm should be pruned, but believes that it points to the value of retaining on a tree all leaves in which the pinnae are substantially green and functioning.

Offshootology

By C. L. Cudebec, Superintendent Hunter Ranch, Indio

SCIENCE may be defined as "any department of knowledge in which the results of investigation have been systematized." For example, Geology, — systematized knowledge regarding the earth's structure. Zoology, — the science that treats of animals with reference to their structure, functions, development, analysis and classification.

Why not then Offshootology, — or the gathering together and classification of what is known regarding the growth, development, care and other phases of the date offshoot.

Even as the future of our country depends upon the care and development of the younger generation, so does the future of the date industry in this country, depend wholly on the care and handling of the offshoot.

Probably we will say nothing herein that is strictly new to the industry, regarding the offshoot. It would be difficult to do so for some grower, somewhere, has observed many or all of the points we might mention. It must be remembered, however, that these institutes are held, not only for the present grower, but also are designed to be a help to those who may wish to embark in the industry. Other than the printed proceedings of these annual meetings, little down to date literature on our industry is available.

Most of us are aware that bud selection in citrus culture has become the cornerstone of all wise development in that industry. Orchards of pomelo, for example, which are the result of bud selection to the fourth generation, are far superior to any of the older plantings.

In the buying of citrus trees we must depend entirely on the reputation and character of the nurseryman. We have only his word that the trees we are about to plant are thus and so.

In the selection of date offshoots we can see and know what we are getting before planting. The mother tree is there to speak for herself and

the offshoot has certain earmarks which ordinarily, label it as worthy or unworthy. Occasionally we are fooled even as in our judgement of certain members of the human family.

The parallel between the date palm and the human family is sometimes striking indeed. For example,—none of us have much use for the spineless man. Even so the wise date grower hews off the spineless offshoot and casts it into the fire. To the newcomer we say, buy only the he-man type of offshoot, bristling with strong heavy-based spines. Also select only those shoots whose outside leaves as well as the heart are deep green in color and whose base is well into the ground, assuring a good root start.

The cutting and handling of offshoots has now become fairly well standardized and the percentage of loss in well cared for young plantings, is small. The right type and vigor of the young plant are the big factors.

As growers we are sometimes puzzled to account for the actions of some trees and their offshoots. There we have a tree of outstanding vigor and beauty but without a sign of offshoot on it. Again we have a very ordinary looking palm but it is surrounded with a family of great big fine type shoots. Over here we have a tree, fine and healthy of itself but surrounded by a half dozen offshoots none of which are worth a penny and never will be. There is still another type where one or more of the offshoots wither and die while the remainder are fine and sturdy. Occasionally these withered shoots are crowded or pinched out by their more sturdy brothers, but many times there is no such crowding and still the shoots simply lie down and die. We find this more prevalent in six or seven year old palms than on younger ones. Perhaps the mother palm gets tired of supporting such a large family and cuts a few of them off in order to preserve her own life.

We have a theory which seems to be borne out by observation, that soil type, soil fertility and early care have much to do with the offshoots on a young palm. If the tree reaches out and does not find certain elements in the soil, it withholds the development of the offshoot bud or at best, weak offshoots appear, many of which soon wither away, or linger along, only half alive.

Frequently a palm which has shown no sign of offshoots for three or even more years, suddenly blooms out with a row of four or five high shoots. Observation leads one to believe that such a tree has either been fertilized a few months previously or it has reached out into a zone which suddenly gave it a supply of the elements necessary to bud development of the offshoot. Those who have uniformly good rich soil, for their plantings, and, who have given the trees thorough care, have an abundance of uniformly strong and healthy offshoots.

We do not believe we are yet at the place where soil analysis will give us data on which to suggest what should be applied in the way of fertilizer to secure best results, where the soil is natively thin and sandy. But work is being done along this line by Prof. L. D. Batchelor of Riverside, who is supervising carefully checked fertilizer tests on palms of various ages here in the valley. Some twelve such tests are being run on our property, which experiments are now in their second year. Something worth while is bound to come out of such work.

Some offshoots grow up into mature trees, bearing fine crops and never do have any offshoots. This tendency, we believe, is becoming increasingly prevalent in our valley. We made this same statement two years ago and it was promptly challenged by certain powers that be. Two more years of observation still more firmly convince us that our previous contention holds good. As to the reason thereof, or perhaps we had better say one of the reasons, we have but a theory or suggestion. The offshoots from a tree that throws but one or two shoots, have a tendency to be still more barren than the parent tree. Again, we think it is quite generally understood, that the later an offshoot is cut from the mother palm, the less chance it has of becoming a prolific producer of offshoots. Growers, we believe, pretty generally agree that what are called "first rim" shoots are the best.

One grower recently said to us, "I'm glad to see a bunch of these barren trees in our plantings. They come into bearing sooner and make bigger trees as a rule." True, they do both of those things, but what about the future should the barren tendency prove to be cumulative? A well known merchandiser of national scope said to us not long ago, "Your entire plantings in this valley are today less than one-tenth of what they should be to create a market for your product." Please get that thought. We should have at least ten times as many date palms in bearing as we now have, in order to create a market for California dates.

Allow us to quote an example which will substantiate the above statement. Some of you know that the writer of this paper is interested in the Paper Shell Pecan industry, which is centered in the district surrounding Albany, Georgia. Probably not less than two-thirds of all paper shell pecans grown in the United States are produced within a fifty mile radius of the above mentioned city.

Speaking of our paper shell pecan industry there in the south, Luther Burbank, shortly before his death said, "You have now but one paper shell pecan where you should have one million to create a market." And right on top of that statement here is another still more striking one, made at the same time by Mr. Burbank. He said, "Had I my life to live over again I would go south and devote it to the production of new species of paper shell pecans. Your pecan tree is the most wonderful engine for the production of food known to man."

Perhaps Mr. Burbank was right, but we wonder sometimes if he ever saw one of our mature palms with three hundred pounds of luscious fruit hanging ripe for the harvest. If he had we think he would have said, "You have only one of these delicious dates where you need two million to create general consumption of them."

Quantity production depends on future plantings and future plantings depend on offshoots. Thus our friend who was glad he had a number of offshoot barren trees was unwittingly contributing to that which holds back the industry today,—namely, lack of sufficient production with which to create a market. Our proportion of overhead in handling and marketing the present production is large and will remain so until we have perhaps several times the present output.

The study of the offshoot then aims at the root and structure of the future of all of us as date growers.

A few cultural practices may be of interest and we believe should be mentioned.

We make a practice of culling the offshoots from our palms twice per season. Wherever an offshoot shows unmistakeable signs of being unworthy we clear it off the tree. By so doing we relieve the tree that much as well as often stopping crowding. Time thus spent pays large dividends.

As to the time best suited for the

planting of offshoots, there are many men of many minds. For our valley, there must be some approximate time which is safe and sane and which can be recommended to the man just entering the business. At present there seems to be a tendency toward earlier planting. Some are cutting their shoots as early as March, many in April. We have planted up to as late as July 20th, with excellent results, but, believe that the medium planting, meaning the month of May and early June, is safe and reliable. By then our spring winds are on the wane and some of these winds don't do the newly planted offshoot any good. They have little or no root and the transpiration during our windy season is very high.

We believe in wrapping the offshoot with burlap at time of planting. It wards off the direct rays of the sun and the following winter protects the heart of the plant. We do not believe, however, in the covering of the top of the offshoot with burlap in this wrapping process. It interferes with the ventilation of the heart of the shoot as well as making the newly grown top-leaves curl and become white and weak.

Rather short trimming of the shoot when planting seems best. Just missing the heart leaf seems to be good practice. You growers know that the foliage at the top and the outside canes of a shoot trimmed long, when planting, frequently die back almost to the base. In the shorter trimmed shoot the outside canes or stubs of the larger leaves remain green for one or two years after planting. These finally spread outward and downward as the heart of the tree grows until they finally lie flat on the ground, at which time they can be safely pruned off.

The letting alone of the leaves of a shoot right up to the time of cutting, is good practice. We have seen many bottle-necked, hide-bound offshoots caused by constant pruning of the shoot as it grew. Now and then a leaf that hinders cultivation can be taken, but the less, the better.

If a shoot does not grow the first year more than a few inches, but still remains good and green, it usually comes on with a rush the second season and almost catches up with other shoots that started when planted. If, however, the offshoot does not get busy the second spring, that is, one year after planting, it might as well be removed. The really stunted shoot seldom comes back. We have nursed trees along for four years, fertilizing, cultivating and coaxing, only to find it was all "love's labor lost."

Again we have seen a tree that was a fine, husky, spiney specimen when planted, and which gradually grew less and less spiney until the center leaves looked like corn stalks. It simply fell from grace and today another husky, spiney shoot with plenty of backbone is flourishing in its place.

Our hope for the future of the industry lies with the offshoot. We trust that each year something may be added to our printed knowledge of the offshoot. In a few seasons we may then have a fairly comprehensive treatise on the life and propagation of this indispensable member of the date family.

DISCUSSION

Mr. Robbins Russel: Since the variety factor enters into the offshoot question, what variety are you speaking of, Mr. Cudebec, the Deglet Noor?

Mr. Cudebec: Yes.

Mr. Russel: You say, Mr. Cudebec, that invironment conditions affect the cell plasm of the date offshoot. Did you mean the offshoots from a mature palm, merely by change in invironment, would be permanently affected?

Mr. Cudebec: The cell plasm can be injured at any time. On our place, we have a certain acre of dates that was not properly taken care of in its younger years. When we took the place, this certain acre was at the age of four years. It was properly taken care of from then on, but four-fifths of the offshoots of that planting from then on were of the spineless character. It was environment and care that changed the entire character of the offshoots.

Mr. Russel: In our own experience, we have a planting that has been as much abused as any planting in the Valley, and in going over the Valley as far up as the Holmes Ranch, my observation would make me hesitate to declare that a once stunted shoot could not come back. Take the Holmes Ranch, for example, it is now developing into a good orchard; the trees making good growth and evidencing that palms stunted for a number of years were not permanently injured.

Mr. Cudebec: Do you mean the old palms there, or the offshoots?

Mr. Russel: I mean the old palms.

Mr. Cudebec: I am talking about the offshoots only. We should differentiate between the two. I am talking about the offshoot taken from the tree and its care.

Mr. Russel: I am talking about the palms on the Holmes place—they do seem to come back even after being abused for a number of years.

Dr. W. T. Swingle: Speaking of "sport" shoots — it is true that the Deglet Noor produces more of this type of shoot than any other variety.

Mr. R. H. Postlethwaite: Concerning stressing the point of having offshoots from the first ring and well rooted—I took the opposite view two or three years ago and tried out two experiments: (1) I took sixty shoots that were at least three feet from the ground and set them out. When I cut them, I found these shoots were old and matured, but after planting, these shoots produced as healthy palms as the other type of shoot. (2) I took certain other shoots that were withered and nearly dead. These were of the Deglet Noor variety and I had quite a few, so decided to cut those that had not died. Some of them were heavily webbed with a dark fungus growth between the shoot and the palm. I cleaned them of this fungus growth and set them out, and most of them grew. If I had left them on the palms, I know they would have died.

Mr. D. H. Mitchell: Did those sixty trees you planted turn out to be barren or not, Mr. Postlethwaite?

Mr. Postlethwaite: They were planted with the other shoots and I cannot see any difference in them from the others. The theory that a high offshoot is barren is not borne out by my experience.

Mr. W. S. Howell: Dr. Swingle spoke some time ago that if the palm eventually lived, it would become a good palm.

Dr. Swingle: I do not feel I know enough about palms to say that. I do think that some stunted offshoots I have known have made good palms.

Mr. Bryan Haywood: One point of Mr. Cudebec's speech that I think might be stressed more, and that is the tendency of the growers here in the Valley to pay no attention to the planting of offshoots for the very fact of fecundity. It is an easy matter for any of us to specialize in a growing of offshoots that are heavy bearers of offshoots. If we wanted to produce a larger quantity of offshoots than the Valley is producing.

it could be done by planting out trees that are heavy offshoot bearing types.

Mr. T. H. Rosenberger: There are three types of Deglet Noor offshoots in the Valley: (1) Tunis, (2) Biskra, (3) M'Zab. I was told years ago there was a difference between these types, but the difference between the Tunis and the Biskra is so slight, it is determined with difficulty by experts. I can tell the difference of either of these two from the M'Zab, not only by the foliage, but by the fruit. The M'Zab produces less shoots than the other types, but the dates are larger and better in appearance than those from most other trees. If the palms from the M'Zab offshoots produced only four shoots as against ten from the other varieties, I would buy the M'Zabs.

Water Penetration

By Bryan Haywood, President of Deglet Noor Date Growers Association, Indio

OWING to the peculiar stratified formation of Coachella Valley soils, wherein waterproof strata of fine silt is a normal condition, the actual penetration of water to twelve or fourteen foot depths is a serious problem.

Practically every date grower in the Valley has a problem peculiar to his particular acreage, and some several different problems in the same garden, all dependig on the location, number and thickness of these impermeable silt strata.

Where the silt is on top and not to exceed a thickness of eight or ten inches, ordinary deep cultivation will, if frequent enough, let the water through, though cultivation on such soil should follow each irrigation.

Where the silt layer is not over thirty inches deep, subsoiling just below the silt will answer. In any case it is well to dig holes at least twelve feet deep in suspected areas to determine if the water actually penetrates to that depth.

My limited personal observation is, that a silt stratum below thirty inches depth will take the water freely from a lighter soil above.

The Dyer B. Holmes garden is a sample of the first type of soil and the successful termination of years of experiment in getting water through this surface is heartening news to others who have a so-called "heavy soil" condition.

It was accomplished by furrowing deeply halfway between the rows and then subsoiling in the furrows.

Pan or check irrigation on such soils is a failure, and a detriment rather than an advantage, because the water gets so hot that it injures any roots it reaches, and very largely evaporates without penetration.

A very interesting chemical experiment is now being tried out on the Chester A. Sparey ranch by George Hutchinson of Glendora, in the use of iron sulphate to break up the heavy alkali soil and allow water penetration. The result will be watched by many with much interest.

There are a lot of conditions that interfere with water penetration beside hard top soil. Too much fall, insufficient cultivation between irrigations, too small head of water, etc., are some, but the greatest and most frequent explanation I have seen is the failure to supply water frequently and in sufficient quantities during the hot weather of mid-summer, when so many of us leave the Valley and our irrigation to the tender mercies of the Mexican.

There can be no set rule for time and quantity of watering—it depends on the weather, quantity of water available and local soil condition, light loam requiring more water frequently and a heavy soil less.

On the Model Date Garden, on light sandy loam, we use 18 acre feet of water in the season with five to seven tons dry sheep manure to the acre and twenty-five pounds of 0-10-12 potash-phosphorus commercial per palm.

The production last year was 310 pounds per palm on the ten-year-olds and 165 pounds on the four-year-olds, and they ran 47% "A" and 31% "B" grade at the packing plant.

I find a lot of misunderstanding on how an acre foot of water is calculated. Almost everyone knows how many inches of water his well produces and fifty inches for twelve hours is an acre foot; if you have five acres, it will take sixty hours to run an acre foot over the whole place.

In conclusion, I would say—don't guess, dig several twelve foot holes and know that the moisture is there.

DISCUSSION

Dr. W. T. Swingle: Did you mean you run your water 24 hours each day for a period of six days? Is that due to a limited amount of water, or is that your method?

Mr. Haywood: Yes, it was due at first to the amount of water. It was kept up because we found continuous moisture more valuable than intermittent irrigations.

Present Status of Date Industry In Arizona

By Roy L. Franklin, Manager Phoenix Date Company, Phoenix, Arizona

FROM 1920 to 1922 the date industry in Arizona made but little progress. Since 1922, however, considerable advancement has been made and today there are approximately 7,000 date palms of imported varieties planted for commercial purposes in the state. Many of these palms are now producing in commercial quantities.

The palms of the Arizona Orchards Company and the Phoenix Date Company, both of which companies are located in the Salt River Valley, are now producing offshoots and fruit in commercial quantities. These two companies have a total acreage of approximately 40 acres. The recent plantings of Mr. J. E. Thompson and Mr. Cleve Van Dyke, together with many smaller ones, bring the total acreage in the Salt River Valley up to about 160 acres.

In comparison with the acreage in Coachella Valley that is now planted to dates, we realize that we are in our infancy. However, the large acreage that can be made available

for date planting, together with our low costs of irrigation and fertilization make, in my opinion, Arizona the most promising district for date culture in the United States.

There are at the present time several varieties of dates planted in the Salt River Valley. The results obtained from many of these have been very satisfactory, while others, on account of having recently been planted, are not yet producing commercially. Therefore, no definite statement can be made at this time concerning their performance. Of the varieties planted commercially in Arizona the Khadhrawi, Hayany, Iteema, Khastawi, Halawi, Zahadi, Sphinx and Maktum predominate. In addition to the above there are quite a number of Deglet Noor and other varieties planted commercially in Arizona.

On account of the different types of soil and climatic conditions, as well as other factors, it is believed by many who are conversant with the date industry, that there are a number of varieties other than those above referred to, which can be successfully grown in Arizona.

At this time there are two medium sized date packing houses in the Salt River Valley and a few small ones. The two larger ones have a capacity of approximately 75,000 pounds annually and the smaller ones approximately 15,000 pounds. Although we are just getting started in the packing end of the business and have quite a lot of experimental work to do along the lines of processing, we feel that we have made considerable progress and that we have accomplished a great deal in the successful handling of dates, and we further believe that the pioneer work done in the packing plants of the Coachella Valley Growers, the Valley Packing Company (Monrovia) and the University of Arizona Experimental Station (Tempe, Arizona) has been a great help to the growers of Arizona.

Our conditions vary somewhat from the conditions existing in the Coachella Valley, since we have a greater annual rainfall. This rainfall usually occurs during the months of September and October and when so occurring is very injurious to some varieties.

This, I believe, covers the most interesting details of the date industry in Arizona since it became an important factor.

DISCUSSION

Mr. D. H. Mitchell: Has a compilation ever been made of the number of acres in Arizona that are really adapted to date growing?

Mr. Franklin: I could not give you the exact number of acres at the present time, but there is quite an acreage other than the Salt River Valley that would run into several thousand acres, that would be suitable to date culture.

Roadside and Mail Order Marketing Or Dates Packed With Loving Care

By Mrs. C. E. Cast, Garden of the Setting Sun, Mecca

THIS talk is to give a different slant, from a different angle, on a different situation — the marketing of dates direct to the consumer, the consumer's demands and our response to them. We will not discuss wholesale marketing, with the dealer's demands or a response to these demands.

A brief history to show why our position is unique and different. In 1915 we bought a seedling garden which was not yet in bearing. For seven years we lived in the East. In 1922 we came to this valley to grow dates. There is no use to discuss the attitude we found toward the grower of soft dates, especially if they had not been imported with an established name. We might just as well have raised rattlesnakes! In most cases the prejudice was honest. They wanted a high standard for California dates. Many felt pity, we were attempting the impossible.

Now this is not the story of a great triumph but the modest story of a garden that justified our faith. This garden from the beginning has paid all its own expenses and furnished us with a living. We had faith in this garden and called it the Garden of the Setting Sun. Just as parents love the child that is unloved out of the family circle, this garden was dear to our hearts. But why the faith when all were so dubious?

When we lived in the East, each year dates were sent us from our garden. That meant a party and all our friends came and ate the dates and pronounced them good. They so enjoyed them that one year we decided to give dates for our Christmas gifts. Packed in redwood boxes, what could be nicer? We ordered them, they came but not from our garden, and were not the soft luscious dates our friends had so admired but firm and drier. You all know the variety. We knew only the tastes of our friends, so we dumped the dates, hid the boxes and with the little money left for Christmas gifts sat up to the wee sma' hours with my trusty needle and made our gifts. Not till we moved here did we know or even guess that the dates sent us were the highly prized and leading variety of the valley. And the one who filled our order had thought he had done us a favor!

The next scene we are here in the valley and it is graually and firmly being impressed on us that what we wish to do is unorthodox. A sort of crime for which one is burnt at the stake. Living at Mecca was sort of outrageous, too, for all know that is the wrong end of the valley. Our soil was salty and heavy and dates are only supposed to grow on sandy soil. In fact we seemed to be wrong in every way.

But we still had faith for we knew our dates were good. So our crop ripened the first year and we found shiny black ones, long slender lady fingers, round plum dates, translucent amber dates. We loved them for what they were and packed them with loving care in just the nicest way possible. My dream was to be an artist and apprecition for lovely things made us want the nicest boxes and containers that money could buy. Not all graded fancy and the others must have the same attention and be arranged as artistically as possible. In fact, any way so they would not be ordinary. We wanted a pack that could not be duplicated anywhere; one that when opened the consumer

would feel, even if they did not say so, "these seem nicer than any others I have eaten. Who packed them?" And we felt that only love of our product could accomplish that. If I couldn't paint a picture any more, I would try to paint one with dates. No Page and Shaw candies were ever more carefully packed. We borrowed from Whitman the idea of a sampler pack, several varieties in a box, so one could sample the various kinds. We advertise original varieties grown nowhere else except at the Garden of the Setting Sun.

I know to some of you this is mushy, not worthy of a serious date institute, but any success we have had is founded on love of our product. We do hold a high ideal before us. We now buy crops and have all of the imported varieties but we never sell by name, only by grade. We reluctantly tell a customer what variety we are offering them. We believe in the assorted pack. The dark and light enhance the appearance of each other. To prove this we had on our table for sale, by special request, a five-pound basket of the largest, most golden Zahidis that we ever have had. To try how people would re-act to a straight pack. The basket was there eight days while other baskets with Zahidis mixed in with the dark ones sold readily. The preference seems to be for the darker dates. Many think they are riper and richer. Invariably they will reach for the darkest date when dates are offered to them.

We sell dates at our home and we like to feel we are "The House Beside the Road." Everyone who enters our door is our friend and is so treated. Whether they represent wealth or poverty the welcome is the same. No one is ever made to feel that they are expected to buy. If they are not enthusiastic over the dates, we prefer they do not buy and make is possible that they make a graceful exit. We are their friend and ask no more.

We are doing a mail order business. As yet we have no cut and dried formula of the best way to reach the prospective buyer. We have tried mailing lists of various kinds with various success. If people have ever had our dates it is easy to gain their attention, if they have no knowledge of dates it is harder. One advertising man told us if we sold one out of a hundred that that was average expectancy. We find we can't afford to mail folders on that basis. The overhead is too great. So just a mailing list has not been overly successful. We have advertised in some of the national magazines. Some that at first did not seem profitable have given accumulated returns in the following years. The snow ball idea, which goes to show you can't figure on one year at a time as to results from one given advertisement. Mail orders seem to grow slowly and surely. Your best advertisement is your satisfied customers.

We have not found success in giving dates away as bait for orders. We find the attitude to be, if you can afford to give dates away they are not worth the price you are asking for them. When hard cash is at the bottom of a transaction, and they have received value for their money, they will gladly proclaim the good tidings to their friends that that is a good place to buy dates.

This brings us to the place, what do customers demand? Nine out of ten, and then some, demand large soft dates. As they climb out of their cars, you can see their lips forming the words, "Have you large soft dates?" If the buying public demands that type of date, it rather behooves us to grow that type of date. The ideal date for trade seems to be large as to size, small seed, skin that does not puff or become brittle in curing. Soft luscious flesh without rag, high sugar content for flavor and to prevent souring. This would be an ideal date, and to date no imported varieties we have found, have all of the requirements. We know of some seedlings (let's call them original varieties, it sounds nicer) that fill the specifications. It is to be hoped if California can raise an ideal date that prejudice will not limit the acreage of that date. We are finding if dates are not only palm ripened but palm cured that the flavor is improved and it is almost impossible to sour them. Nature sometimes has secrets that will help all of us. In buying crops from different gardens we find if we can get the grower to not over-irrigate, over-fertilize, and then will leave the date on the palm till thoroughly ripe, the date is sweeter and no trouble to handle. An over-irrigated date is larger and like the water berries of the grapes will not hold up. In a week the flesh has shrunk, the skin is loose and perhaps the date is sour. Let us not forget the date is a desert plant and when it fights its own fight without being too pampered, gives a richer and better fruit (Some will feel I don't know a thing about it and I agree that I don't. All I know is a result we find that shrieks to heaven, when you handle ceaselessly and endlessly dates).

The outlook for marketing dates is a bright one. If we give our brains to developing new markets instead of fighting each other, the sky is our limit. We must hang together or we will hang separately, according to the old quotation. There is room for all the varieties of dates. Let's be kind to each other. Let's be tolerant of our neighbor, his dates and his ideas (if they are honest), for he should be our friend. Let us have faith that dates are the finest food in the world; that everyone is our prospective customer, whether he knows it or not; that everyone needs dates, should eat dates and it is our duty and privilege to tell them so; that dates must be loved and not treated as pesky nuisances and dumped on the market higgly-piggly, but in the packs that will increase the demand —packs that we are proud to offer our friends, the ultimate consumer. For the world is our friend and we are offering the best thing in the world to him.

Lest we forget — Faith, Hope and Love, the greatest of these is Love.

DISCUSSION

Mr. T. H. Rosenberger: Mrs. Cast said they produced the finest quality of dates when they did not over-fertilize and over-irrigate. Have you any information, Mrs. Cast, on what is the required amount of water or fertilizer?

Mrs. C. E. Cast: I cannot tell you the exact amount of water or fertilizer, but I do know that when we over-irrigated, the dates were large and soft, but did not hold up—they were like the water berry of grapes. I do know that you can increase the size of your dates to the detriment of their quality.

Cooperative Marketing

By Paul S. Armstrong, Assistant Manager of California Fruit Growers Exchange, Los Angeles

I THINK the most distinctive part that I play on this program is that I know absolutely nothing about dates, except what I heard this morning. However, I am very glad to come here today and have the opportunity to discuss cooperative marketing, as there may be something in citrus experiences you can apply to your date industry, as the general principles of cooperative marketing are much the same wherever applied.

I well remember the first time I ever came into contact with American dates. It was while I was living in Washington, D. C. Among my Washington friends was Dr. W. A. Taylor, who was then and is still the Chief of the Bureau of Plant Industry. His son and I were school chums and one night Dr. Taylor gave a most unusual dinner. It consisted almost exclusively of products introduced into the United States by the Bureau of Plant Exploration. Among the things that were served was the meat course derived from an animal which was a cross between the cow and the buffalo. Instead of potatoes we had a product called, as I remember, "dasheen," a starchy tuber supposed to be suitable for growing in our southern states. For our dessert we had some American dates. Whether they were grown in Arizona or California I don't know, but they were delicious — not the accustomed kind of those days which you had to get out with the ice-pick.

So I am glad of the opportunity to attend this meeting to learn about your cultural problems and to contribute anything I can about cooperative marketing. Although our commodities are different, the principles that govern are the same in general. I come before you not in the role of an expert at all, because there are many here who have had as much or more experience. Perhaps, too, you have heard the best definition of an expert as "a man who is a long way from home," and as there are so many people here from Los Angeles I personally cannot qualify.

It has long been a saying that a cooperative is "born of adversity" and some add—"and frequently dies of prosperity." Cooperative marketing was rarely resorted to by the farmer in any commodity until all existing systems had failed and the industry was in distress. A cooperative organization represents the opportunity of agriculture to use the methods of big business, which are well known and are becoming increasingly popular and respected in this day and age. The formation of organizations similar to ours has been encouraged by the nation and the state to such an extent that farmers are permitted to work together in pooling arrangements. The Government says frankly to the agriculturist, "we want you to form cooperative institutions to work out collective handling to the end that your industry shall prosper." Cooperative organizations are recognized as sound from the standpoint of public policy and it is generally appreciated that the privilege and power of combination cannot abuse the public interest in the field of agriculture. It seems strange that in the face of the Government's increasing interest and the obvious advantages of collective effort, it is so hard to build up membership in a sound cooperative institution. The individual may have certain pet ideas he feels would be effective in solving the problems of an industry, but his hands are tied—he is helpless alone. I think one of the factors that militate against the growth of the cooperative movement is the sense of independence of the farmer. While the farmer has taken pride in his economic freedom and has been known as "independent" for generations, yet essentially he is the most dependent of business men. He has had less to say about the price he would take for his commodities than most any class of business and though he is "independent" in his cultural operations, he is very "dependent" in his marketing relationships. Yet all recognize there are a great many farm problems that are too complex for the individual to cope with.

I think one of our outstanding problems in California is our distance from the markets. We figure that the average orange, for instance, travels 2600 miles from the tree to the consumer's table, 70% of the crop being sold east of the Mississippi and north of the Ohio rivers. What chance has an individual grower marketing at that distance?

The failures in cooperation are heralded abroad because cooperatives are virtually semi-public utilities and thence become the warning to all other industries that attempt a similar solution to their marketing problems, while on the other hand the successes of cooperatives are not so generally known or appreciated. One of the chief planks in the farm relief program is the aggressive Government support of cooperative marketing. There are today 12,000 cooperative organizations with a membership of two million farmers, transacting an annual business of two billion dollars. I must necessarily use the California Fruit Growers Exchange as an example in my discussion, because I am much more familiar with it; but then too, the Exchange has been pointed out as one of the successful examples in cooperative marketing because of its continuous and effective operation since 1895.

There is no "one best" method of cooperative organization. It takes quite a different type of cooperative set-up to sell cotton, grain, etc., than it does oranges, lemons, prunes, or dates. One mistake that has been made in cooperative marketing development has been that of taking a set-up from a successful organization and transferring it bodily to another. Frequently the plan was not inherently suited to the new circumstances and consequently failed.

I haven't time to go into the details of the organization of the Exchange, but will try to cover the high lights. Probably you know that the basis of the Exchange is the grower, of which there are 11,500 at the present time in its membership. A group of growers who live in a certain community and who have sufficient production to justify the formation of a local association for handling of their crops organize cooperatively to provide collective packing and handling facilities. The legal set-up usually provides that each grower's interest in the cooperative is proportionate to his acreage and sometimes is adjusted on a revolving fund plan to the production that he has from year to year. The growers elect from their own number a board of directors and that board selects a manager who is supposed to be an expert on handling their commodity. They also elect a director to sit on the district board. The district exchange is the inter-

mediary link between the local association and the central exchange.

It would be impracticable to deal individually with each of the 200 associations on sales matters so that in the Exchange system provision is made for a connecting unit known as a district exchange, the manager of which is an expert in selling rather than production and handling, and who serves as the marketing agent for the group of local associations which are tributary to the district. There are 205 local associations of the type I have described and 22 district exchanges. These 22 district exchanges are actually the legal members of the California Fruit Growers Exchange. Each district exchange selects a director to represent it on the Board and he attends the weekly meetings of the Central Exchange, held in Los Angeles. These directors are subject to change, of course, whether local, district, or central, at the pleasure of their constituents.

One thing that I want to emphasize in the local situation is this—that the Exchange system of organization encourages local and individual incentive to the utmost. It does not contemplate the pooling of all of the fruit in all of the localities or reducing superior production to a common level of price. Each local competes just as strongly as possible with all other locals in service and results to the growers. Each takes great pride and satisfaction in its return per pound to the grower as compared with others and in the reputation and standing of their brands. If one can get an exceptionally low per box packing charge, it is a matter of great renown. Each car of fruit sells on its own merits and the association and the growers too, receive the particular reward of their own effort. Local pride is a splendid thing and the competition between packing houses and localities in quantity and quality production and in handling efficiency is a healthy impetus to progress. From the point, however, where distribution and selling begins, collective facilities and policies are essential to best results.

The basic accomplishments of cooperation can be summarized under four main points:

(1) Standardization—General grade standards which the trade and consumer can buy with confidence; each local association has its own brand name; there being over 600 local brands in the Exchange and over 200 of these brands are of Sunkist specifications. All have the opportunity under their own house brands, subordinate to Sunkist, to build up an individual reputation. Here is a jobber, for example, who has used the "blank" brand of Valencias. Week after week an order will come in for that particular brand from the same jobber. The sale itself is handled by the Exchange district sales manager in the market, but the quotation is invariably made by the sub-Exchange representing the association. The local name on the end of the box doesn't mean anything to the consumer, and it doesn't mean much to the retailer, but it means a lot to the jobber. Sunkist is merely the name which certifies to the trade and consumer a standard of quality or grade, and which is owned by the central organization, being the collective property of each of the locals, but the individual property of none.

I have been much interested in this discussion of varieties of your dates. We have been very fortunate in that our production has been substantially centered on only two varieties of oranges—the Valencia and Navel. California production for this year will run about 40,000 carloads of Valencias and 38,000 carloads of Navels, with about 3,000 carloads of miscellaneous varieties. We have been fortunate in this respect in contrast with Florida, whose oranges number many different varieties. This is a day of mass selling instead of individual selling and production must be reasonably standardized with concentration on one or at most a few varieties.

(2) The second big thing that a cooperative can accomplish is intelligent distribution. Perfect distribution implies the right quantity at the right place at the right time. This is never completely attained, but the more a product is under unified control, the better the result. A jobber will most naturally play one seller against another, if a market is oversupplied. For example, take a market like Lansing, Michigan—say we put two cars a week on track there and unknown to us a car of someone else's is placed there at the same time. A buyers' market temporarily results and the jobber plays one shipper against the other to see from whom he can buy the cheapest. Of course, we can always divert the car to some point farther east, which we frequently do, rather than take a lower price for our fruit, but either of the alternatives is expensive to the grower. A cooperative having knowledge from past records of how much a market can absorb, supported by telegraphic advice on current conditions, can easily keep the supply in tune with the demand if it has control of a high percentage of that supply.

(3) The third accomplishment of cooperation is the maintenance of fair prices. These are essentially based on the supply and demand relationships, which in turn are the result of proper distribution. Intelligently regulated distribution returns to the grower the best possible value consistent with supply and demand and likewise presents a fair value to the consumer or the consumer will turn to something else.

(4) The fourth thing a cooperative can accomplish is the work of advertising or sales promotion to increase the basic market. One distinction in cooperative effort as compared with the advertising objectives of most private corporations, is the purpose of advertising primarily to increase the total demand for the commodity and only secondarily to increase the market for our particular brand. A private advertising campaign on the other hand is frequently designed to get people to use my product instead of yours. The salvation of an industry, however, lies chiefly in increasing of the total demand and keeping it ahead or at least even with production

Advertising has been defined as "the art of stating the truth attractively," and although the methods may seem complicated, all we intend to do in an advertising campaign is to point out to the consumer the uses of our product and the health arguments, if we have them. I have always held that the strongest appeal in food advertising is the appetite appeal. Fortunate indeed is the commodity which has both health appeal and appetite appeal, which is true of most fruit. I hesitate to suggest how much tobacco would be used if we could truthfully advertise the health appeal instead of appetite alone. With oranges, we have both. A thorough study of the possibilities of the date may reveal a great many additional uses and recommendations which you may not know at the present time. We consider orange juice for child feeding to be the cornerstone of our demand. If you can sell a mother on the necessity of feeding orange juice to the childen, there will be oranges in the house for that purpose, then the appetite appeal will cause the rest of the family to also use oranges and they will have to buy more oranges to feed the babies.

Lately you may have noticed the turning of our health counsel to the

common trouble of Acidosis, meaning an excess of acid in the system. The acid forming foods are good, staple foods that people eat most and think least about—meat, eggs, fish, poultry, etc., so that we are now adding to our health arguments the building up of alkaline reserve obtainable from citrus fruits as well as other fruits and vegetables which offsets the acid foods eaten. People generally have had an impression that citrus fruits added to rather than relieved acidity.

I think the Valencia industry, which now exceeds the Navel industry in volume, would be in a hopeless situation at this time if it were not for the orange juice demand. Ten years ago people ate half an orange at a time with a spoon. Now they drink their oranges and consequently use more. It takes one large or two small oranges at the very least to make a respectable serving of orange juice and we estimate that more than 50 per cent of the oranges are now consumed in the form of juice. These are but examples of advertising opportunity.

Citrus fruit production has trebled during the last twenty years. This year California is producing 40,000,000 boxes and Florida about 22,000,000 boxes, making a total supply for the American public this year of 62,000,000 boxes. This growth is five times greater than the natural increase of population. The present per capita use per year is 55 oranges, 17 lemons and 5 grapefruit, approximately. If each person in the United States could be persuaded to eat one more orange a year than they now do a new market for 1500 cars of fruit would thus be created.

All new industries coast along for a time on the natural demand existing for all products of merit during the early stages of limited production. Capital flows to the new industry because of high price levels and as the acreage is extended and production increases, it soon becomes necessary to expand the market. Avocados are in a very interesting stage of this cycle at the present time. As it is now, the avocado is a high class product selling to a limited market and the need is urgent to broaden demand. Probably the date industry will at some time get in the same position. I do not know enough about the date situation to speak on that, but I was very much interested in a statement made this morning that the present volume was not sufficient to really create a market. The great mass of people as yet do not know what California grown dates are.

Grapefruit here in California is having a similar evolution. The acreage has trebled here during the last five years. Up to the present time our grapefruit has been sold on a limited Western market. California Coast county fruit, although not considered by most consumers the equal of Florida fruit, has been able to average more f.o.b. California than Florida fruit has f.o.b. Florida. There were sold on the Pacific Coast last year, from all sources including Florida, about 1750 cars of grapefruit. We have enough grapefruit planted in California now to produce 6000 cars or more on a production basis of 200 packed boxes per acre. We exported 27 per cent of California grapefruit production to Great Britain last season and 17 per cent went east after Florida had disposed of her supply last summer. Sixty per cent was sold on the Pacific Coast.

It is necessary for us to capture all of the West Coast market and in addition extend our markets eastward and abroad. If the producer will recognize the problem in time, we need not feel pessimistic about our grapefruit problem, but only cooperation can meet it. A new district exchange, known as the "Desert Citrus Exchange," is being formed down here (consisting of a local association in El Centro, Brawley and two in Yuma) to tackle the desert grapefruit problems. There will be an open door for grapefruit growers in the Coachella Valley, when organized locally, and also growers of grapefruit in the Salt River Valley of Arizona.

In conclusion, I would say some of the essentials necessary for successful cooperative operation are (1) The practice of representative government, allowing effective expression for the individual growers. (2) Local responsibility with locally managed plants to maintain individual incentive. (3) Development of complete information well disseminated to members. (4) The business ability of the cooperative to return more money to the grower than any other competing agency can—that is what gives results and is most conducive to membership.

One thing a cooperative can be sure of, it always has its marketing problem abreast of it, for success creates its own competition.

DISCUSSION

Mr. Bryan Haywood: Is not the keynote of a Cooperative summed up in Unified Sales?

Mr. Armstrong: Collective selling and competitive production. You are right.

Mr. T. H. Rosenberger: Is there added strength in the competitive production in your different exchanges? Would not, say the Mission Brand, be better for all the exchanges, instead of having a brand for each separate exchange, or is there an advantage in competing of brands under the Sunkist trademark?

Mr. Armstrong: That is a very proper question. I cannot say how it would work in any other industry, but I think in our industry there is a psychological advantage in just this way—the packing house manager is a lot more jealous of his own brand, say the Shamrock or whatever it may be, than he would be of the Sunkist as a whole, and he will do things to the Sunkist brand that he wouldn't do to his own brand. Any packing house manager will traffic with everybody else's reputation more than with his own.

Mr. Robbins Russel: Referring to Mr. Haywood's remark regarding unified selling, is it not absolutely important in a cooperative selling organization to have grower control, and not have subservience of the growers to any group? In other words, haven't you worked out a system throughout the Central and District exchange where the opinions of the individual grower is immediately, or almost immediately, felt in the Central organization, and where it has to be responsive to that opinion? Is not that one of the keynotes of your present success?

Mr. Armstrong: Yes, that is perfectly correct. The selling facilities should be grower owned and grower controlled, collectively, not individually. If they are all collectively operating, you get away from the price cutting between one group and another, and they have the marketing evidence right before them. The broker is grower controlled just the same as the salaried man.

Mr. W. D. Olds (sales manager of Hills Bros. Co., Los Angeles): The thought that Mr. Armstrong brought to my mind when he told us what would happen if everyone in the United States could be made to eat one more orange per year was, to think what would happen if everyone should eat just one more date a year. In addition to the production you had in this Valley in 1928, you would have to add to that production again and again to meet the demand. We have at the present, per

capita consumption of one-third of that in Great Britain, although this country is a larger fruit eater than any other country. It isn't really as much a problem of production as we view the date industry as a whole as a problem of increasing the consumption of the date.

I certainly am pleased to have the opportunity of meeting with you here and have enjoyed the interesting talks about dates. I hope we can see many of you sometime in the East, so you can tell us how you do it, because we come here frankly with admiration for what you can produce in the line of beautiful, attractive varieties of dates.

Mr. B. S. Boyer: We would all like to know about how many dates Hills Brothers import annually, or at least for this past year?

Mr. Olds: We charter normally about four steamers which we lay along Basra in September. These each hold about 5,000 tons, so that our usual yearly import runs around forty million pounds. This year it was in the neighborhood of thirty-five million pounds, all by no means going into the Dromidary package. A large percentage goes to candy makers in this country, and I regret to say to people who market them beyond our immediate control in California.

Progress of Date Scale Eradication Campaign

By B. L. Boyden, Federal Horticultural Board, Indio

THE Parlatoria scale is a very small soft bodied insect which, shortly after hatching from the egg, attaches itself by means of its beak to the living tissue of the date palm and remains stationary the rest of its life. It is protected by a shell or scale, that of the female being dark gray or black bordered with white in color and oval in shape. The male scale is smaller and narrower than the female and white in color.

Eggs are laid by the female which remain under the scale until the young hatch. The crawlers or young scale are equipped with legs and after emerging from the scale are quite active for a few days. Then they insert their beaks into the plant tissue and spend the balance of their lives sucking the juices from the palm.

As this insect is wingless and for the most of its life firmly attached to its host, its spread is slow. The natural factors in its spread are probably birds, winged insects, and wind. Also the movement of offshoots and pollinating are responsible for some infestations.

The first known occurrence of this insect in the United States was in 1890. In that year a shipment of date palms was received from Africa and found to be infested with a scale insect, until then unobserved by entomologists. An attempt was made, which at the time seemed successful, to eradicate this scale before the plants left Washington but some of the insects survived and the palms were later found infested in the field.

This was the beginning of the fight against Parlatoria scale which is still in progress. A Bulletin of the Arizona Agricultural Experiment Station dated June 1, 1895, tells of the first work carried on against the scale and a later bulletin dated September 23, 1907, gives an account of a systematic attempt to eradicate the pest.

In California I believe the eradication campaign was started in 1913. Considerable progress has been made in the control of the pest and many gardens have been cleaned both in California and Arizona but more plantings were being made and the palms were growing rapidly in size.

In 1927 an outbreak of the scale in Arizona and several new infested plantings in the Coachella Valley alarmed those concerned in the work and an appeal was made to State and Federal agencies which resulted in an emergency appropriation of $25,000 to conduct a survey of the situation to decide whether or not complete eradication of the insect was feasible.

The plan was to keep the scale under control in the infested areas and make a survey of the entire date growing area and at the same time make a careful study of the history of the project.

It was soon evident that the size of the project had been underestimated and that with the funds available the work could not be carried on as vigorously as seemed necessary.

This preliminary work disclosed the fact that there were approximately 136,000 palms in the Coachella Valley, 30,000 in the Imperial County, 30,000 in the Salt River Valley, and 18,000 in the Yuma district.

It also indicated that there was an excellent chance of eradicating the scale if prompt and vigorous action was taken.

A meeting was arranged by the Permanent Scale Eradication Committee of the Coachella Valley growers which was attended by Quarantine officials of the States of California and Arizona. The entire situation was discussed and a definite program decided on, calling for the expenditure of approximately $200,000 in two years and a half, the State of California to contribute $50,000, Arizona $20,000, and the Federal Government the balance.

As our original Federal appropriation was not sufficient to carry our already reduced force until Congress and the State Legislatures could take the necessary action, the State of California contributed $25,000 from her emergency fund in December which enabled us to keep our trained inspectors and begin to build up our force to the needed strength. In the meantime the other appropriations have been made and we are now properly financed.

As you all know eradication and control are two entirely different words, and the meaning is entirely different. To control an insect means to keep it reduced in numbers to the point where the damage to plant and fruit is negligible and in most cases means the expenditure each year of considerable time and money. Eradication means the killing of the last insect, a more difficult task but if accomplished the industry affected is freed from the annual tax.

I believe we have an opportunity here to rid the date industry of its most important insect pest for all time. Many gardens have already been cleaned and it would seem that the entire date growing area in the United States can be cleaned.

The Parlatoria scale breeds only on date and closely related palms. While it increases in number rapidly the spread from palm to palm and garden to garden is very slow under the present conditions. From all indications a palm must become quite heavily infested before the chances are very great for spread.

If by careful and frequent inspections of the entire area we can locate and treat the infested palms, we can eventually get that last scale we mentioned.

The death of this last scale cannot be postponed too long, however, as the number and size of the palms are increasing from year to year increasing the difficulty and cost of inspection and facilitating the spread of the scale.

The general plan for the eradication of the scale is simple: First locate and inspect all the date palms in the date growing areas and then kill all scale on the infested palms.

This calls for very careful work as every single palm must be located, the presumption being that the last scale is on the last palm. Also the plantings must be mapped and listed so that in the repeated inspections that are necessary no palms may be missed.

Inspections must be careful and at frequent intervals as we are basing our hopes on finding and treating individual infested palms before the infestation has reached the point where it will spread.

The standard treatment of an infested palm is complete defoliation and cutting back the fiber to expose the scale, then running over the exposed surface with the flame of a gasoline torch. This treatment has been the object of much comment and criticism as being too drastic. It is true that it is somewhat severe as it causes the loss of about two and a half years crop but the palm does not seem to be permanently injured. The scale gets behind the fiber on the leaf bases where it cannot be reached by ordinary spraying or fumigation and the only known method at present is as described. Also the records show that in most instances the gardens have been cleaned by the treatment of a comparatively small percentage of the total number of palms. As the matter stands now we are using the best known proven method but naturally we will try to improve our methods.

This eradication campaign as you probably know is not the effort of any one organization but a cooperative piece of work by the growers, the state and county quarantine organizations, and the Federal Department of Agriculture.

Mr. Boyden presented a very interesting relief map showing the infested areas in this Valley in 1928. The heavily infested areas were easily shown to have been carried by wind and birds into uninfested areas. Mr. Boyden told us that twenty-two properties were infested in 1928, covering a total of 1592 palms. In the Imperial Valley, the inspectors covered about 30,000 palms scattered over the valley, most of which are dooryard palms. In the Salt River Valley there are some commercial palms and also a large number of palms scattered over the district. In Phoenix in 1928, they found five properties infested, a total of thirteen palms.

DISCUSSION

Mr. Bryan Haywood: I am sure, Mr. Boyden, the folks here would be interested in knowing the how and why of the digging up of the palms along the highway?

Mr. Boyden: Our idea is that in case of these neglected seedlings having scale, it is cheaper to dig them up than to have to inspect them, and it removes one hazard in the scale game.

Mr. Sanderson: What do palms look like that are damaged by scale?

Mr. Boyden: The scale is a small insect that gets so numerous on the leaves, that the leaves look as if they are covered with white chaff. It eventually gets on the fruit and spots it.

Mr. B. K. Marvin: If there are infested palms in the garden, how many palms are treated?

Mr. Boyden: The whole system is based on the palm itself as a unit. Repeated inspection is used to try to locate other palms that we think are infected.

Mr. Marvin: How many palms are treated by the blow-torch if only two are found infested on a certain place?

Mr. Boyden: Only those two.

Discussion of Date Offshoots

By Leonhardt Swingle, Indio

DATE growing is different from most other kinds of fruit growing in that each date grower is also a nurseryman. The small number of new plants that can be secured from each palm and the high value of the palm after the period of reproduction is past, has made it impractical to leave the propagation of the date in special hands as in other fruits. Each date grower, to the extent of growing and removing his offshoots, is of necessity a nurseryman as well as a fruit grower.

In the past the main interest has been the offshoots and the fruit has been a secondary matter. This attention to offshoots has been most necessary in starting the industry, but the writer cannot help but feel that the change now being made to a fruit basis, will be a benefit to all. When the attention of the growers is centered on fruit production, the quality and yield of fruit will certainly improve to the benefit of the industry and to the stabilizing of the offshoot market.

There is no thought in these remarks of not appreciating the benefit that the attention to offshoots has had on the date industry. Without a high value for offshoots and the attention they have secured in the past, it is safe to say that date growing would be many years behind its present development. A high price for offshoots has been the means of starting the industry and a proper supply of offshoots in the future is of vital importance, but after all, the main end of date growing is the production of fruit, and a distinction between the offshoot growing and fruit growing parts of the business will be of benefit to both.

It is possible that certain growers or localities may find it profitable to specialize on the nursery or offshoot end. We already have an example of this in the growing of Deglet Noor offshoots at Yuma where the production of fruit is not profitable. It may also be profitable to grow certain rare varieties for a number of years solely for their offshoots, and sell the trees for collections or dooryard plantings after the offshoots have been removed. It is said that in North Africa, certain sections do not depend on their own offshoots but import their planting stock from other date growing districts.

The whole question is an economic one and will be settled on that basis. We cannot afford to grow offshoots at a loss just to have the satisfaction of starting an industry. If we can-

not make a profit out of the fruit as we go along, people will say we have not started anything worth while. If we make money out of the fruit as we go, it will be the very best incentive to save and utilize the offshoots.

There is no doubt that the palms over the valley are not producing as many offshoots per palm as did the first imported trees. The older plantings of Deglets produced ten or more offshoots to the palm, but the newer plantings will only produce five or six in many cases.

It is equally apparent that the young trees are growing much faster now than they did in years past. Better care means better and more fruit and fewer offshoots to the palm and the writer cannot see but that this is desirable. It is not a tendency of the variety to run out or degenerate as some may think. Pedigree records show that the number of offshoots to the palm is not so much a matter of heredity as a factor connected with the vegitative vigor of the palm. An abundance of food and water seems to force all growth into the main bud and the offshoots buds are choked out or do not develop, leaving the palm to produce fruit that much quicker. It is perfectly possible to point out exceptions to this rule, but the writer will take a very positive stand, that **the number of offshoots per palm is in inverse ratio to the rate of growth.** This is of course comparing palms of the same variety.

A good example of this fact is the Iteema in Arizona. We think of the Iteema as producing an abundance of offshoots but some palms in Arizona, that are making very rapid growth, have no more offshoots than Deglets.

Perhaps some day we will learn how to control the number of offshoots by fertilizing but consider for a minute that dates are grown on a very wide range of soils in this valley. There are at least five main classes with all gradations between. The palms behave very differently on these different types but we cannot say that one kind of soil produces more offshoots than another. The correlation is between vigor of the palm and not soil type. We find differences all right but still under the head of the faster the palm grows the fewer offshoots it bears.

This rapid growth is not a liability but is our great asset in date growing. Our gain in yield and time makes up for our lack of offshoots per palm. If we grow to maturity a total of only five offshoots to the palm but do it in five years, it is far better than growing a total of 20 offshoots to the palm but taking ten years to do it. Take a pencil and figure it out.

This brings us to the point that it costs money to grow offshoots. A great many people have the idea that the price of offshoots will go steadily down till it finally becomes two or three dollars or even less. It is not going to do so except in special cases or forced sales. It costs money to grow offshoots in three ways:

1. Loss of fruit. If we have offshoots on a palm we will cut down the fruit yield, not only by the substitution of offshoot buds for fruit buds, but also by cutting the roots of the palm when the offshoots are removed and hence injuring the current and possibly succeeding year's crop. A conservative estimate of the loss of fruit sustained when offshoots develop on a palm as against a similar palm with no offshoots, would be 500 pounds and might very easily reach twice that. At 15 cents per pound that is $75.00.

2. Increased cost of care of a palm with offshoots as against one without. No figure will be put on this amount but anyone who has had to dig Bermuda or other weeds out of palms covered with offshoots knows this is quite an item. This, remember, is in general care of the palm and not any special care that the offshoot itself will need and receive.

3. Loss in time in bringing the garden into fruiting. This may or may not amount to very much but whatever it is means just that much more capital outlay that must be met by a heavier annual interest charge in the years to follow.

When we secured an average of ten offshoots to the palm and sold them for $20.00 each to meet these offshoot costs, there is no doubt it was profitable to grow offshoots. Fruit could very wisely take a back seat. But now our palms only bear five or six shoots worth from $5.00 to $10.00 each or we can secure somewhere between $25.00 to $60.00 to meet these costs, and, — it does not pay at $5.00 each. I do not say that when a person sells offshoots for $5.00 each he is losing money on each shoot sold, but he might have made a great deal more money if he had cut the offshoots off and thrown them away. He must make more money off his place in after years to be even with the person who did not grow offshoots but grew fruit from the start.

The industry needs the offshoots but it is a little too much for the present date growers to supply them at a loss.

Mention has been made of bud selection in the selection of offshoots. Now bud selection to mean anything must be a selection of buds for several generations with known production records of each generation. Any other talk of bud selection is meaningless in this day. The same is true in dates. Selection can only mean anything when we have the record of the parent for several generations back. Only by this method can we pick out the different strains that are undoubtedly present in date varieties but which are so impossible to segregate at this time. Only by a pedigree record can we properly evaluate the spotted soils of the valley.

We can look at an offshoot and tell if it is an apparently good offshoot of the variety in question but even so, offshoots change their characters sometimes. The question of abortive offshoots is a very long and complicated problem and date growers will probably argue about it till the end of time. Sometimes bad looking offshoots get better and sometimes they get worse.

The writer has, or rather had, on his place three trees of this nature. One was quite abortive in character but outgrew this tendency and for the last three years has been a palm of very good character bearing crops of good fruit. The second palm was not so bad to start with but gradually became worse and had to be dug out after eight years of care. The third palm has varied back and forth and is now quite abortive in character but bears some very good fruit.

About all we can do with abortive offshoots is to throw them out whenever they show any such characters and hope that no other offshoots become aborts later.

It is well to note in this connection that shade and rapid growth weaken the spine growth and many shoots that look rather poor promptly develop plenty of spines and make good trees when planted in orchard form.

The statement is also commonly made that first ring offshoots are

best and high offshoots are no good. The writer does not believe this is at all proven, and in fact doubts very much if this is true.

Our attention in the past has all been directed in growing our offshoots or selling them at a good figure and many important questions such as the cost of the offshoot crop, its control as to number and kind of offshoots produced, the segregation of the different strains, and other problems have been neglected and it is well to start thinking about some of these questions. Any discussion of offshoots that starts people thinking about these problems has accomplished something worth while.

Date Culture In Southern Morocco

Especially the Methods and Tools Used in Pruning the Leaf Spines Preparatory to Pollination

By Walter T. Swingle, in Charge of Crop Psysiology and Breeding Investigations, U. S. Department of Agriculture

IN the spring of 1927 I received an urgent invitation from the head of the French Government Commission to accompany them on a visit to Morocco to study the very destructive Baioudh disease that attacks the date palm there. As this offered a very exceptional opportunity to study the magnificent date region of the Tafilalet country in southern Morocco this invitation was promptly accepted and early in April I left this country, arriving at the previously determined rendezvous at Figuig in extreme southeastern Morocco on April 24, 1927.

Dr. L. Trabut, the government botanist of Algeria, the head of the Baioudh Commission was, unfortunately, prevented by ill health from accompanying the Commission on the field trip but Prof. Rene Maire, the Chief of the Department of Botany, University of Algiers, Algeria, took his place as the leader of the Commission to which was also attached the well known entomologist, Prof. M. Vayssiere, who had previously studied the insects of the date oases of Morocco and who represented Entomological Service of the National Agricultural Institute at Paris;, Morocco was represented by Mr. P. Regnier, the Chief of the Plant Quarantine Service of Morocco, Mr. de Lepiney, Official Entomologist, and Mr. Humberger, Botanist of the Forestry Service of the Moroccan Government; Algeria was represented by Prof. Maire and by his associate, Prof. R. Killian, a well known plant pathologist and mycologist of the University of Algiers. We were also accompanied on the return trip from Tafilalet by Prof. Henri Humbert, another associate of Prof. Maire in the University of Algiers, who, like his chief, has for some years past been studying the extremely interesting desert and mountain flora of Morocco.

All expenses of this expedition were paid by the Moroccan government which furnished automobiles for travel as soon as we left the end of the railway at Colomb-Bechar. As this was a government mission it was given every facility in all parts of southern Morocco, even in the Tafilalet country, which is the greatest single date planting in all Africa and which is still, for the most part, in rebellion against French rule, so that our party could not have made the trip had it not been able to take advantage of the military protection given a general who was visiting the region on an inspection trip.

These details are mentioned because this extremely interesting date-growing region is, at present, almost inaccessible to foreign visitors and, for that matter, is practically closed to French civilians and to all but high military officials. I felt extremely fortunate to be able to take advantage of this opportunity to see this great date region, one where many interesting and valuable date varieties can be found and where extremely interesting cultural methods are followed.

As I discussed this trip last year before the Date Institute, I need not do much more than mention briefly that the Baioudh disease, which the Commission was called upon to study, is one of the most dangerous and at the same time one of the most mysterious plant diseases known. It is found only in Morocco and has apparently spread gradually from west to east in southern Morocco and has now reached the oases on the boundary line between Morocco and Algeria. It is manifested by sudden wilting of one or more leaves in the middle of the crown followed by the more or less rapid death of the rest of the leaves which wither, dry up and turn whitish as they die. Finally the whole leaf crown dies and then follows the death of the offshoots. No adequate cause has yet been located for this mysterious trouble and the Baioudh Commission recommended the Moroccan Government to establish a special pathological station for the scientific study of this terrible disease which has in many oases completely disheartened the native date growers who are afraid to make new plantings on account of the constantly impending danger of the loss of their palms by the mysterious Baioudh disease.

Strangely enough there are no serious insect pests attacking date palms in southern Morocco. There is no Parlatoria scale, no Marlatt scale, no spittle bug and no date mite to be found and most careful search was made by the two official entomologists as well as by the pathologist and by myself during the three weeks we were travelling in the date oases of southern Morocco. *See footnote.

This probably means that the date plantings of Morocco must have been originated many centuries ago from seed brought from Egypt or Arabia or some other remote country and not by shipping in offshoots since the offshoots would have carried these insect pests of the date which are common all the way from Algeria through to Persia. On the other hand the Baioudh disease is apparently limited to Morocco, which leads to the supposition that it might have spread to the date palms from the wild palm that grows commonly in many parts of Morocco.

The Baioudh disease attacks different varieties with very different

degrees of virulence and it it said that in the Oued Dra in extreme western Morocco, where the disease was first observed and where it has been present for several centuries, it now causes comparatively little damage, which doubtless means that relatively immune varieties have taken the place of those that were susceptible to Baioudh which have been killed out by the disease.

The famous Medjhool variety of Tafilalet and nearby regions in southeast Morocco is very susceptible to the Baioudh and in consequence is not being planted in oases where the disease has gained a foothold. **See footnote.

Pruning Spines and Leaves of Date Palms

An attentive study of the pruning of date palms preparatory to pollination in May, 1927, soon brought to light the fact that the whole system of pruning — both the methods of pruning and the tools used — vary greatly in different oases in the Sahara Desert. In extreme southern Morocco the date growers are, most of them, native Berbers converted centuries ago to Mohammedanism. They all prune the spines off the leaf stalks very skillfully but the tools used were very different at Colomb-Bechar on the Algerian border, and at Bou Denib 85 miles to the west. In these two oases the system of pruning was nearly the same but the tools used were quite unlike. The pruning tool at Bou Denib was a short cutting hook on a rather long wooden handle in direct continuation of the flat shank of the hook.

These pruning hooks are made by native blacksmiths out of large flat files obtained from Europe. At Colomb-Bechar the pruning tool is very different from the one just described, being a slanting, curved cutting blade with a slight out-curve, like the beginning of a hook, near the tip. The cutting edge is about 7 to 9 inches long and the upper end of it is welded to a heavy rectangular iron shank about ¾x1½ inch wide and 14 to 15 inches long. The upper 5 inches is fastened in a cylindrical wooden handle about 5x1½ inches. This tool is heavier than the pruning hook used at Bou Denib, but both are used in the same way, that is, they are pulled up the petiole rapily and skillfully to prune off the spines and are used with a swinging blow to cut off an old leaf at the base.

I was astonished at the skill and the speed shown by the natives in pruning spines. I estimate that they did the work many times faster—probably five or ten times faster—than it is usually done in this country and moreover it is done better, as the petiole is almost never scarred or slashed, since the sharp pruning tool is drawn upwards and as the petiole slowly and regularly diminishes in size there is little tendency for the knife to cut into the petiole and prune away a slice of the edge along with the spine on it. Furthermore the spines slant away from the petiole and tend to deflect the knife away from the petiole rather than toward it.

In pruning spines with a down stroke, as is often done in this country, the knife tends to be deflected towards the petiole by the stiff slanting spines and as the petiole steadily increases in size towards the base there is constant danger of the knife cutting into the edge of the petiole and once it starts cutting in, it is difficult to avoid cutting off a long strip of the petiole that certainly does it no good and may do harm, to say nothing of the unsightly scars such careless pruning causes.

In southeastern Morocco the trunks are cleaned up more or less and the old leaf bases and fiber trimmed away and at pollination time all spine pruning is done then. Possibly some of the old leaves are cut away preparatory to harvesting the fruit. Certainly I did not see in the spring at pollination time enough leaf pruning in these Moroccan oases to keep pace with the annual production of new leaves.

Going a few hundred miles east to Biskra in southern Algeria I was still able to see pollination in progress the second half of May, 1927, on account of the unusually cold spring weather of that year. To my surprise no spine pruning seems to be done either in Biskra or in the great artesian basin of the Oued Rirh that extends a hundred or more miles to the south. The natives who were busy pruning off the old leaves and cleaning up the trunks preparatory to pollination expressed great surprise that anyone would want to prune off the spines because, as the laborers told me, "the spines all point up, up! If you remember that, there is no danger of getting hurt on them." Thereupon they climbed up the palms and barefooted and barelegged moved about freely in the tops to pollinate all the flowers without getting a single scratch from the vicious spines.

The pruning tool used at Biskra is the sickle used by the natives to cut barley and now turned out on a large scale by French manufacturers. It is poorly adapted to cut leaves or spines.

At El Arfiane, near Tougourt, about 100 miles south of Biskra, a very interesting pruning tool was observed in use. It is a diminutive sickle with a nearly-straight, saw-toothed blade only four or five inches long, set at an angle on a short metal stem ending in a handle. It was observed in use in pruning leaves from offshoots and is doubtless used for general pruning purposes. It is a very efficient tool for its small size and light weight. It might be useful to American date growers as a light, yet very efficient pruning hook to carry in pollinating or in pruning, placing, or bagging the date bunches before the dates ripen and for any necessary pruning when the fruit is gathered.

Aside from its rather heavy weight —some two pounds—the special date pruning knife seen at Colomb-Bechar seems to be the most efficient tool seen. It remains to be seen which, if any of these pruning tools, will best fit our needs. Very likely we will devise new tools of our own that fit our needs better than any tools now used by the Arabs.

It will certainly be of advantage to us to see and test the tools that have been developed by the Arab. This has already been done in the case of the offshoot chisel that has been modified until it is now certainly a more efficient tool in this country than was the form originally observed in the old world date oases.

It is obvious from what has been said above that the opinion commonly held by the usually well educated European officials who exercise direct authority over the Arabs, that the Arabs know all that is to be known about date culture is obviously refuted by the fact that the natives of different oases, even in the same general region, follow very different practices and by such contradictory practices as pruning off the leaf spines as done in southeastern Morocco and leaving them all on as at Biskra and the adjoining Oued Rirh region. They cannot both be right.

As a matter of fact date culture has developed more or less independently in many regions as is proved by the wide diversity of varieties grown, methods of pruning, pollination, etc., followed and by the distribution of insect pests and fungous diseases.

It cannot, therefore, be assumed that because American or European

investigators have studied carefully the methods followed by Arab or Berber cultivators in one region they have thereby learned all there is to know about old world date culture. We must realize that something of value can be learned about the date palm and its culture in almost every different group of oases where centuries of accumulated experiences have built up a certain standardized practice.

*The superb palms of the oasis of Colomb-Bechar, just inside the southwest Algerian frontier, have recently been destructively attacked by the two date scales, Parlatoria scale and Marlatt scale. This infestation was traced to a few offshoots brought from Biskra some 15 years ago. The awful havoc wrought by Parlatoria scale in this oasis has aroused great fear of the consequences of introducing this pest into the great date plantings of Tafilalet and Oued Dra, both of them already ravaged by the mysterious Baioudh disease.

On first thought it seems strange that the Parlatoria scale that does very little damage in Biskra or Tunis should prove so destructive in a new region like Colomb-Bechar. The explanation is, however, very simple. In the Biskra region and most other old world date regions the Parlatoria scale has doubtless been established for centuries and natural enemies have developed that hold it in check. In shipping offshoots from Biskra to Colomb-Bechar these natural enemies were lost, as has been done in shipping old world date offshoots to the United States. Two small predacious beetles, Cybocephalus (Nitidulidae) and Pharoscymnus (Coccinellidae) observed to feed on Parlatoria at Biskra have been introduced by an Algerian Government entomologist, A. Balachowski, into Colomb-Bechar. They do not as yet give much promise of controlling the ravages of Parlatoria. Doubtless there are other more important natural enemies, possibly parasitic Hymenoptera, that have not yet been observed at Biskra or introduced into Colomb-Bechar that keep the Parlatoria scale insect in control in the older date countries. The biologic control of Parlatoria in the old world has not yet been worked out and urgently needs more study. Apparently there is no effective biologic control of Marlatt scale which works deep down in the crown of the palm well protected from any natural enemies. Marlatt scale, unlike Parlatoria scale, does not injure young palms to any degree but on the other hand it greatly curtails the yield of old palms and may finally completely sterilize them so they produce no crop at all.

**The first week in May, 1927, eleven offshoots of the Medjhool variety were cut from palms growing in a date garden at Bou Denib free from Baioudh and irrigated from a ditch that passed no diseased date palms. These offshoots were found clean in Washington in June, 1927, but were given careful vacuum fumigation with cyanic acid gas after which they were shipped over the Union Pacific Railway to extreme southern Nevada where they were planted on an Indian Reservation the first week in July, 1927, just two months after being cut. Although several of the offshoots were very small, all lived and are now growing and by February, 1929, they had produced 22 new offshoots. They are, so far as known, the only date palms in Nevada and are naturally very well isolated. As the Baioudh disease is said to appear within two years, at the most, after infection, the Medjhool palms in Nevada will be known to be free from Baioudh long before any offshoots can be cut from the eleven offshoots originally imported. It is necessary to use great caution in buying Medjhool offshoots in Morocco as the offshoots on palms showing the first signs of Baioudh, although healthy in appearance are said to be certain to show the dread disease later. Such suspected offshoots are sometimes cut and sold by ignorant or unscrupulous date growers and are a great source of danger.

DISCUSSION

Mr. Bryan Haywood: What is old age for a Deglet Noor?

Dr. Swingle: The Marlatt scale does practically no injury for the first ten years, but as the palms get older the scale gets worse and the crop is cut down about 1% for the next ten years, and at an increasing rate as time goes on. The actual life of a palm in the Old World is cut down many years by this scale. There are probably not many palms over 100 years old. I think this scale is worth our consideration. You will find the Marlatt scale more and more a heavy burden as the trees grow older, unless we can by spraying control this insect pest.

Mrs. C. D. Clark: Is it a special variety they are growing?

Dr. Swingle: Yes, Deglet Noors, mostly.

Mrs. Clark: How do they compare with our best grade of Deglet Noors?

Dr. Swingle: Well, the best of them are better, although Deglet Noor growers here do not believe it.

Mr. B. K. Marvin: When I was in Algeria, I met a prominent packer, whom you no doubt know, Dr. Swingle. He has a packing house in Marseilles. He asked me about package dates in this country. Recently I had a letter from him making inquiries about how to better establish his market here. I answered that if I were dealing in coal, I probably would tell him what I could about dates. But, as he was trying to sell in my market, I must decline to assist him.

Dr. Swingle: You would be interested to know that a few years ago when I was in North Africa I thought the sale of Deglet Noors under their own name would build up a market for them. I tried to get large exporters in Marseilles to go into it, but they said they had a good home market for their good dates — they wanted to sell their cull dates in America.

A Voice: Do they process their dates?

Dr. Swingle: They do now. They have curing rooms very similar to our own.

Mr. D. H. Mitchell: Are these plantations under European control or native?

Dr. Swingle: Under European control. Water costs nothing. They have artesian wells that run a steady stream of water, nine-tenths of which runs over the land as waste water, causing a lot of disease. The plantations pay 25c per day for their help. Offshoots cost about 25c to 50c apiece.

Mr. Mitchell: Then it is possible for these people to put good quality dates on our market at a cost of 7c or 8c per pound?

Dr. Swingle: I haven't told the full story. I told this man that if I were running his place, I would discharge all his men and send to California and get $5.00 a day men. These 25c a day men would not follow his directions whenever his back was turned and would go on doing exactly as their grandfathers had done. I think they get from 10c to 15c a pound wholesale for their Deglet Noors—about 20c to 30c a pound retail.

A Voice: Is that net to the grower?

Dr. Swingle: No. The native grower is cheated out of much of it. He accepts an advance from the buyer early in the season and then later in the season regrets having sold his crop so cheaply, and forces the buyer to get the crop off promptly.

Mr. B. S. Boyer: Have they as heavy production per palm in the Old Country as in this country?

Dr. Swingle: No. They do not grow as many per palm, and yet, if we lose 15 pounds out of a 275 pound crop, we worry for a week.

Mrs. Clark: In this new modern method of planting, do they plant their trees as closely together as in the old plantings?

Dr. Swingle: No. I brought the French method to this country and they recommend thirty feet apart and the newer plantings are set out

this way. Except for the cheap labor, they would grow good dates, but the Arab will not follow instructions.

Mr. Marvin: I saw so much Parlatoria in a certain garden it seemed to me they would be doomed in the next five years. What is the history of such gardens?

Dr. Swingle: I watched gardens for a good many years. Some would become white with scale and then some natural enemy (the French have found two of these natural enemies) would come along and kill the Parlatoria off. The French brought scale into the beautiful oasis of Colomb-Bechar in Morocco by imported offshoots. They are becoming greatly alarmed now by this scale. Over 100,000 palms are badly attacked by Parlatoria. The French government sent two commissions to study the scale, and I predict the two little beetles they have introduced will never control this disease there, although it is wiped out about every five years by some natural enemy.

A Voice: Do their dates ripen all at once, or how does it happen they pick the whole bunch off?

Dr. Swingle: With the low grade of dates in Iraq, they pick the whole bunch, such as the Sayer variety, throwing them on the ground as you saw in the picture, but the better dates they pick carefully, even the Zahidi, which is not a very good variety, and lower them from the trees on large trays. They pick dates about three times and the last time they cut the whole bunch off.

Mr. Mitchell: In several packages I have seen of imported Deglet Noors, I found traces of worms. Do they do any fumigating at all?

Dr. Swingle: Yes, but the dates are carried hundreds of miles before being fumigated and sometimes become infected before packing.

A Voice: Which is more injurious —cutting off the spines or the leaves?

Dr. Swingle: Cutting off the leaves is highly injurious. I believe the leaf makes on an average of a pound of sugar a year, and I consider you cut off a pound of sugar each time you cut off a leaf. I know of no place that they prune the leaves closely. They prune the spines in Morocco, but leave all the green leaves on the palm.

NATIONAL AGRICULTURAL LIBRARY
1022934290